What is claimed is:

- 1. A method of testing an electrode structure in which a plurality of electrodes are arranged in a matrix, comprising:
- (a) positioning a test unit at a position of 5 a target one of said plurality of electrodes apart from said target electrode by a preset distance, wherein said test unit has a MISFET having a source, a gate and a drain;
- (b) applying a first voltage to said target lo electrode such that a gate voltage is induced at said gate by electrostatic induction;
- (c) applying a second voltage to at least one of said source and said drain such that current flows between said source and said drain based on said gate 15 voltage; and
 - (d) examining a value of said current to determine an electrical connection state of said target electrode.
 - 2. The method according to claim 1, wherein said preset distance is equal to or less than 20 $\mu\,\mathrm{m}$.
 - 3. The method according to claim 1, wherein said
 (d) examining includes:

determining that said target electrode is electrically disconnected when said current value is

- 5 lower than a predetermined threshold value.
 - 4. The method according to claim 3, further comprising:
 - (e) applying said first voltage to a next electrode adjacent to said target electrode; and(f) repeating said (d) examining.
 - 5. The method according to claim 4, wherein said
 (f) repeating includes:

determining that a short circuit is formed between said target electrode and said next electrode when said current value is equal to or larger than a predetermined threshold value.

6. An apparatus for testing an electrode structure in which a plurality of electrodes are arranged in a matrix, comprising:

a testing unit including an array of field effect transistors, each of which has a source, a gate and a drain, wherein said testing unit responds a test instruction to carry out a testing operation for sequentially determining whether each of ones of said plurality of electrodes corresponding to said transistors is in an electrical disconnection state or

in a short-circuit state, based on a value of current flowing between said source and said drain in each of

said transistors by use of electrostatic induction
while a first voltage is selectively applied to said
15 electrodes;

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a driving unit which relatively moves said testing unit with respect to said electrode structure in response to a move instruction while keeping a predetermined distance between said electrode structure and said testing unit; and

a control unit which outputs said test instruction to said testing unit, and outputs a move instruction to said driving unit when said testing operation by said testing unit in response to said test instruction is ended.

7. The apparatus according to claim 6, wherein said testing unit carries out a disconnection testing operation of said testing operation in which a second voltage is applied to at least one of said source and said drain in each of said transistors when said first voltage is applied to said corresponding electrodes such that a gate voltage is induced at said gate of said transistor by the electrostatic induction, compares said current value and a threshold value to determine that said corresponding electrode is in said electrical disconnect state when said current value is lower than said threshold value, and repeats said disconnection testing operation to said corresponding

electrodes.

- 8. The apparatus according to claim 6, wherein said testing unit carries out a short-circuit testing operation of said testing operation in which said second voltage is applied to at least one of said source and said drain in each of said transistors when said first voltage is applied to an adjacent electrode to said electrode corresponding to said transistor, compares said current value and said threshold value to determine that said corresponding electrode is in a short-circuit state when said current value is equal to or larger than said threshold value, and repeats said short-circuit testing operation to said corresponding electrodes while said first voltage is applied to said adjacent electrodes.
 - 9. The apparatus according to claim 6, wherein said testing unit comprises:

said array of transistors, wherein said drain of each of said transistors is applied with said second voltage;

a group of amplifiers provided for said array of transistors, wherein each of said amplifiers amplifies said current value from a corresponding one of said transistors to produce an amplified current

10 value; and

a comparing unit which compares said threshold value and each of said amplified current values while scanning said amplified current values, and outputs to said control unit a comparing result indicating whether each of said amplified current values is equal to or larger than said threshold value.

10. The apparatus according to claim 9, wherein said testing unit has a higher stage portion in which said array of said transistors is provided, and a lower stage portion in which said group of amplifiers and said comprising unit are provided, and

said higher stage portion opposes to said corresponding electrodes to have said predetermined distance.

- 11. The apparatus according to claim 10, wherein said predetermined distance is not larger than 20 μ m.
- 12. A method of testing an electrode structure in which a plurality of electrodes are arranged in a matrix, comprising:
- (a) carrying out in response to a test
 instruction, a testing operation for sequentially
 determining whether each of ones of said plurality of
 electrodes corresponding to field effect transistors

of a testing unit is in an electrical disconnection state or in a short-circuit state, based on a value of current flowing between a source and a drain in each of said transistors by use of electrostatic induction while a first voltage is selectively applied to said electrodes; and

- (b) relatively moves said testing unit with respect to said electrode structure in response to a move instruction while keeping a predetermined distance between said electrode structure and said testing unit, said move instruction is issued when said testing operation by said testing unit in response to said test instruction is ended.
 - 13. The method according to claim 12, wherein said (a) carrying out includes:
 - (c) carries out a disconnection testing operation of said testing operation in which a second voltage is applied to at least one of said source and said drain in each of said transistors when said first voltage is applied to said corresponding electrodes such that a gate voltage is induced at said gate of said transistor by the electrostatic induction;
- (d) comparing said current value and a threshold value to determine that said corresponding electrode is in said electrical disconnect state when said current value is lower than said threshold value;

and

- (e) repeating said disconnection testing operation to said corresponding electrodes.
 - 14. The method according to claim 12, wherein said (a) carrying out includes:
 - (f) carrying out a short-circuit testing operation of said testing operation in which said second voltage is applied to at least one of said source and said drain in each of said transistors when said first voltage is applied to an adjacent electrode to said electrode corresponding to said transistor;
- (g) comparing said current value and said threshold value to determine that said corresponding electrode is in a short-circuit state when said current value is equal to or larger than said threshold value; and
- (h) repeating said short-circuit testing
 15 operation to said corresponding electrodes while said
 first voltage is applied to said adjacent electrodes.
 - 15. The apparatus according to claim 12, wherein said predetermined distance is not larger than 20 μ m.
 - 16. An apparatus for testing an electrode structure in which a plurality of electrodes are arranged in a matrix, comprising:

a testing unit including an array of field

5 effect transistors, each of which has a source, a gate
and a drain, wherein said testing unit responds a test
instruction to carry out a testing operation for
sequentially determining a value of current flowing
between said source and said drain in each of said

10 transistors by use of electrostatic induction from
each of ones of said plurality of electrodes
corresponding to said transistors while a first
voltage is applied to said electrodes;

a driving unit which relatively moves said testing unit with respect to said electrode structure in response to a move instruction while keeping a predetermined distance between said electrode structure and said testing unit; and

a control unit which outputs said test

20 instruction to said testing unit, and outputs a move
instruction to said driving unit when said testing
operation by said testing unit in response to said
test instruction is ended, wherein said control unit
determines each of ones of said plurality of

25 electrodes corresponding to said transistors is in an
electrical disconnection state or in a short-circuit
state, based on said current value.

17. The apparatus according to claim 16, wherein said testing unit carries out a disconnection testing

operation of said testing operation in which a second voltage is applied to at least one of said source and said drain in each of said transistors when said first voltage is applied to said corresponding electrodes such that a gate voltage is induced at said gate of said transistor by the electrostatic induction to produce said current value, and

and a threshold value to determine that said corresponding electrode is in said electrical disconnect state when said current value is lower than said threshold value.

18. The apparatus according to claim 16, wherein said testing unit carries out a short-circuit testing operation of said testing operation in which said second voltage is applied to at least one of said source and said drain in each of said transistors when said first voltage is applied to an adjacent electrode to said electrode corresponding to said transistor, to produce said current value, and

said control unit compares said current value

10 and said threshold value to determine that said

corresponding electrode is in a short-circuit state

when said current value is equal to or larger than

said threshold value.

19. The apparatus according to claim 16, wherein said testing unit comprises:

said array of transistors, wherein said drain of each of said transistors is applied with said second voltage;

a group of amplifiers provided for said array of transistors, wherein each of said amplifiers amplifies said current value from a corresponding one of said transistors to produce an amplified current value; and

a switching unit which sequentially outputs said amplified current values to said control units.

20. The apparatus according to claim 19, wherein said testing unit has a higher stage portion in which said array of said transistors is provided, and a lower stage portion in which said group of amplifiers and said switching unit are provided, and

said higher stage portion opposes to said corresponding electrodes to have said predetermined distance.